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C O N T E N T S

Electrophoresis and pH: What They Mean to the Mill Man

"Textile Research: A Review of Progress"

Abstracts

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Book Reviews

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ELECTROPHORESIS AND pH: WHAT THEY MEAN TO THE MILL MAN#

By Wm. D. Appel, Chief, Textile Section,
Bureau of Standards, U. S. Department of Commerce

Nothing so euphonious as "electrophoresis" nor so cryptic as "pH" would have held the slightest interest for the mill man a few years ago. Today it is not unusual for him to express the degree of acidity or alkalinity of solutions on the pH scale. Tomorrow he may find the electrophoresis cell to be a promising tool for the solution of mill problems. The results of the academic research of today are the basis for future mill practice.

A brief description of two recently completed researches on textiles may emphasize the practical significance of academic research in this field. These studies were made possible by a grant from the Textile Foundation. They were carried out at the Bureau of Standards by Dr. Milton Harris working as a research associate from the American Association of Textile Chemists and Colorists.

When wool or silk is immersed in water or in an aqueous solution, for example in a scouring bath or a dye bath, the fibre becomes electrically charged. This is readily demonstrated by cutting the fibre into very small pieces and suspending them in the solution. If electrodes connected with a source of current are then placed in the solution, the fibre particles will move to the positive or negative electrode depending upon whether the fibre particles have respectively negative or positive charges.

The nature and magnitude of the charge on the fibre depend upon the acidity or alkalinity of the solution in which the fibre is placed. Acidity and alkalinity are conveniently expressed on what is called the "pH" scale. The value 7 on this scale represents neutrality just as the value 32 on the Fahrenheit scale of temperatures represents the freezing point of water. A solution of pH 7 is, like pure water, neither acid nor alkaline. A solution of pH 1 (for example, a dilute solution of hydrochloric acid) is strongly acid. A solution of pH 13 (for example, a dilute solution of caustic soda) is strongly alkaline. Wool and silk are usually processed in solutions within this range.

The first research was simply to determine the nature and magnitude of the charge on wool when immersed in solutions of different acidities and alkalinities. Clean wool was pulverized and the powder suspended in solutions of known pH. The mobility of the wool particles was then measured by placing the suspensions in a special glass electrophoresis cell and observing through a microscope the rate at which the particles moved toward one of the electrodes. The theoretical and practical problems incidental to the application, for the first time, of these electrophoresis measurements to wool need not be enumerated. The results can be visualized from the curve relating the mobility of the

#Paper presented at meeting of U. S. Institute for Textile Research, Inc., May 4, 1932.

particles to the pH of the solution.

The curve for pure wool protein shows clearly that the wool is positively charged when in solutions having pH values below 3.4 and negatively charged when in solutions having pH values above 3.4. At pH 3.4 the wool is electrically neutral. This is the iso-electric point of wool, as the name implies. The iso-electric point of wool or silk has this significance for the mill man: It is the pH at which the fibre is least soluble and at which it undergoes minimum swelling. The further the pH of the bath in which wool is processed is from its iso-electric point the greater will be the action on the wool.

The shape of the mobility - pH curve brings out important characteristics of the fibre. It shows that wool has a relatively large positive charge when in solutions of pH 2.5 or lower, and a relatively large negative charge when in solutions of pH 4.5 or above.

It is not surprising to find that when wool is treated with sulphuric acid in carbonizing (low pH) the wool combines with the acid and holds it tenaciously. The mobility - pH curve for the wool-acid combination is entirely different from that of the original wool. However, if the acid is removed by judicious neutralization with ammonia and washing, the wool is found to have the same mobility - pH curve as the original wool. Wool, which has been damaged in carbonizing may tell an entirely different story. That is a subject for further study.

The differences in affinity for dyes of wool in solutions of different pH and the well-known difference between wool and carbonized wool in amount of dye absorbed from a given solution may be found in the mobility - pH curves. Dye molecules and aggregates in solution are electrically charged. For example, the colored ions of the acid dyes are electrically negative and those of the basic dyes electrically positive. Since wool is positive in solutions below pH 3.4 one would expect it to absorb from such solutions greater quantities of a negative acid dye than of a positive basic dye. The amount of a negative dye absorbed should increase with increase in acidity of the solution. Conversely, the amount of a positive basic dye absorbed should increase with a decrease in acidity of the solution, especially for pH values above 3.4 when the wool is negative. According to the theory, wool having an over all negative charge still has the ability to combine with a positive material in a limited degree and accordingly can still take up a limited amount of negative dye. Experiments designed to elucidate these points are in progress. Whether they prove or disprove them, the experiments certainly should furnish data on the chemical mechanism of dyeing. Further knowledge of the charges on fibres and dyes should prove of importance to a better understanding and control of dyeing processes.

The iso-electric point of silk is being determined in the same way as that of wool. The value of about 2.5 for the iso-electric point of silk, as indicated by preliminary results, is in excellent agreement with that obtained by other workers using other methods and demonstrates the applicability and value of the electrophoresis method.

The marked differences in wool and silk shown by their curves indicate the difference in reactivity of the two fibres and lead to interesting speculations regarding their dyeing characteristics with different types of dyes. They offer still further means for determining more about the dyeing reaction. At about pH 2.5 and 3.4 respectively silk and wool are electrically neutral. Between pH 2.5 and 3.4 wool is positively and silk is negatively charged. Above pH 3.4 both are negative. The pH 3.8 is of special interest for study of the mechanism of dyeing, for in solutions of this pH silk and wool have a negative charge of the same magnitude.

One of the advantages of electrophoresis measurements for studying the effect of processing on silk and wool is that very small samples are adequate. Thus small damaged areas, or areas which do not dye like the rest of a piece of cloth, may be studied.

The second research had to do with the effect of light on silk. It was thought that some idea of the action of the light could be obtained if the rate of deterioration of silk treated with solutions of different degrees of acidity and alkalinity were measured. Accordingly, samples from the same silk were immersed in solutions of different pH values, were dried, and then exposed simultaneously to light. Contrary to what might be anticipated from the ease of hydrolysis of silk in alkaline solutions, silk treated with a fairly strong alkaline solution, pH 10, has maximum stability to light. Silk treated with a 0.4 per cent solution of caustic soda was more stable than the same silk treated with a 0.4 per cent solution of sulphuric acid, or than the pure silk treated with nothing at all. These observations suggest at once that silk for curtains, for instance, should be finished at pH 10. Whether other conditions will permit of such finishing must be decided by the mill man.

The rather unexpected wealth of material of interest to the mill man resulting from these relatively simple studies should be emphasized. The object of one study was to determine the iso-electric point of wool. Not only was this accomplished by a more direct and reliable method than those previously used, but out of the work has come a realization of the significance to textile scouring, dyeing, and carbonizing of electrophoresis measurements and of the electrophoresis cell as a tool, not previously applied to textile evaluation. Although the study of the decomposition of silk by light has by no means solved this problem, it suggests a novel and apparently very practical method of increasing the stability of silk to light.

Fundamental or academic research usually does open a constantly expanding horizon of practical possibilities. This is especially true in a field like that of textiles. The mill man can look with confidence to the United States Institute for Textile Research for facts and ideas which will guide his work, because the Institute is committed to a program of fundamental research.

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"TEXTILE RESEARCH: A REVIEW OF PROGRESS"

The board of editors of "Textile Research: A Review of Progress" have adopted a suggestion of President Garvan that will greatly broaden the value and appeal of the volume, but that will necessarily delay its publication, probably until September.

President Garvan believes that it is quite as important to interpret scientific textile research results and trends in non-technical language to those of the industry lacking scientific training, as it is to record research progress in scientific terms. In fact, it is his opinion that one of the industry's greatest needs is education as to the results and possibilities of scientific research. His views are based upon actual experience in the promotion of research work in other industries by the use of interpretative literature.

To cover fully President Garvan's suggestion it has been necessary to have an introductory chapter prepared that will describe in non-technical language the results and trends of recent scientific research, and also make plain the tools and methods of modern science that may be utilized to solve textile problems and establish fundamental textile facts. For the authorship of this chapter the board of editors has been fortunate in securing the services of Dr. Vannever Bush, vice-president of Massachusetts Institute of Technology and dean of the engineering department. Dr. Bush's contribution should alone be worth the price of the volume.

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ABSTRACTS

HOW DURABLE ARE TEXTILES? A WAY TO DETERMINE IT.- Adolf Rosenzweig.
Textile World, May 14, 1932, Pp. 24-26.

An article discussing the relationship of abrasion tests to service tests. Illustrations of three machines are given,none of which abraded the sample in such a manner that tensile strength determinations are of any value. No details are given of the machine used by the writer of the article but his statement that "tensile strength bears no relationship to durability" would seem to indicate that it was of the same type as those illustrated. While lacking in definite information as to the abrasion test the article is of value because it points out very briefly a method for correlating laboratory with service tests. (S)

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FEDERAL SPECIFICATIONS BOARD PROPOSES TEXTILE TEST METHODS.
Textile World, April 2, 1932, Pp. 36-37.

This is the proposed method of testing textile materials purchased by the various departments of the United States government and released by the Federal Specifications Board. Procedures for the determination of moisture content, total sizing and finishing material, breaking strength, tear resistance, weight, width, thread count, color fastness, and shrinkage are given. (S)

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SOME CHEMICAL ASPECTS OF SILK WEIGHTING.- A. A. Cook.
Am. Silk & Rayon Jnl., June, 1932, Pp. 45, 46, 69.

Continuation of article from May, 1932. The writer considers it doubtful whether, in properly (moderately) weighted silk "there is any direct chemical action on the silk fibroin in a deleterious sense." Deterioration due to sunlight in the presence of air and moisture is discussed, and it is considered possible that, by suitable buffering, an alkali reserve could be maintained at an optimum pH of 10.0, at which the maximum stability of silk protein to light was found by Harris and Jessup. He discusses the question of damage in weighted silk through the presence of chlorides, and expresses the opinion that they do not necessarily cause rapid deterioration, even when present in such amounts as may be left by contact with perspiration and sea water, but that the weakening of the fabric is cumulative and certain. He also discusses the effect of wear and tear, of dry cleaning and of dyeing. He refers to various substances that have been suggested for preventing deterioration of weighted silk by such external factors as light and chlorides, and considers it significant that practically all of these are antioxidants. Research as to these various causes and effects is declared necessary, particularly as to the factors concerned in the stabilization of the silk molecule, or aggregate. (C)

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A CONSIDERATION OF THE MECHANISM OF DYEING.- A. J. Hall.
Am. Dye. Rptr., 1931, 20, P. 809.

Rayon fibres swell in water to a large extent laterally and but little longitudinally, thus altering the lateral spacing of the micelles. If the spaces are larger than the dye particles, the latter enter and stain the micelles. Any chemical or physical condition which reduces the size of the lateral spaces diminishes the size of the particles which may enter the fibres and decreases the intensity of the color. Longitudinal stretching by compressing lateral spacing impairs dyeing. (W) (Copied complete from Chem. Abs., 1932, 26, 1446.)

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SOAPS, SOAP POWDERS, SOAP-SOLVENT MIXTURES, DRY-CLEANING, AND MISCELLANEOUS CLEANING AND POLISHING PRODUCTS III: RECENT PATENTS COVERING.- C. E. Mullin and Lawrence Hart.
Textile Colorist, 1932, No. 637, P. 21-25.

Brief history of soap, as used by ancients. Patents on raw materials dealing with purification and refining of fats and fatty oils; also deodorizing of animal and vegetable oils. Authors' remarks are really brief extracts of the patents. Patents on manufacturing dealing with saponification of fats under pressure; compressing soap into molds; use of alkali hypochlorites or aldehydes to saponify fats, oils or fatty acids; making soap under pressure in a saponifying apparatus. Patents covering making of soap powders. Patents for making castor oil miscible with mineral oils. Patents for use of triethanolamine for production of wetting, cleansing and emulsifying agents. (G)

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DYEING COTTON STATIONERY.- George Rice.
Textile Colorist, 1932, No. 638, P. 100.

Comments on increased use of cotton for stationery especially in colors. Describes the cotton used and treatments needed before dyeing, such as cleaning and carding. Gives data on raw stock dyeing, as used in some cases. Gives methods and shows diagrams of a jig and a padder such as is used in dyeing goods in the piece. Explains that singeing and calendering are necessary to produce a surface which will not blur when the writing is done with ink. (G)

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PARTIAL ALKALINE HYDROLYSIS OF ACETYL SILK AS A PRE-TREATMENT FOR DYEING.- W. Coltof, H. Waterman and I. G. Wolf.
Z. Angew. Chem., 1931, 44, P. 163-8.

Superficial hydrolysis of acetylcellulose fibres in dilute NaOH and sod. acetate, at 60°and 70° under standard conditions, attained maximum effects that depended on the alkali concentration. Complete deacetylation did not occur. Absorption of Benzopurpurin increased from a negligible amount on untreated fibre to a maximum corresponding to a loss of 2-3% in deacetylation, and greater absorption was produced only by prolonged dyeing. This factor is important to the dyer, as a severe hydrolysis of the fibre is useless if followed by too rapid dyeing. (W) (Copied from Chem. Abs., 1932, 26, P. 1446.)

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WATERPROOFING AND SHOWERPROOFING.- "RAYCOT".
Textile Colorist, 1932, No. 638, P. 87-88.

States that material coated with a continuous layer of impermeable substances such as rubber, asphalt, pyroxylin, cellulose acetate, and similar substances makes a watertight resistant film but that natural perspiration liberated from the skin would condense on the inner side of the material and be objectionable. The goods being air-tight as well as water-tight are the cause of this condensation. Showerproofing is described as different from waterproofing because it allows egress of perspiration vapors and ingress of air. Methods are given for impregnation with metallic salts, either alone or in combination with soap; and for the use of emulsified fats and waxes and then passing through solutions of metallic salts. Also describes the glue, gelatin and casein method. Formulae for all are given, also benefits or objections of the methods. (G)

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PRACTICAL APPLICATION OF COLOR MATHEMATICS TO DESIGNING.- J. E. Simons. Textile Colorist, 1932, No. 638, P. 89-92.

This article deals with the converting of the mathematics of color into a visual concept and of methods of determining the speed of an already established color. Such knowledge enables the designer to obtain harmonious effects and balance in his designs. A table shows the names of the basic colors used with their speeds. By use of small dropper sticks, the number of drops represent the units or speed of each different color used in the design; then mathematically the vibratory speed or actinic force of the mixture is easily calculated. The results from using the small dropper sticks can then be duplicated in larger quantities by using gallons as a unit instead of drops of color. The unit might also be quarts or barrels or any other measure. Instead of mixing colors by the dropper method, you might wish to use oil tube colors, in which case the author uses one-eighth inch of color squeezed from the tube as his unit. Examples of determining speed of various mixtures are given in good detail, and the mathematical methods for the same are fully described. Examples are given to show the relations between colors and also between color and background. For instance, one example shows the proper percentage of color for a certain design worked out mathematically to be: cream background, 30.86%; green leaves, 28.85%; yellow, 23.04%; pink, 17.28%. From this the designer can plot out the required number of square inches to be used by the leaves and flowers of his design to give a balanced harmonious result. An example is also shown of wrong mixing of colors. The author states, "From this it will be obvious that if one follows the principle of color mathematics, the proper balance in design will follow as a natural result. This will preclude any possibility of overloading or skimpy dressing in pattern." (G)

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CELLULOSE XL. DEPENDENCE OF VISCOSITY OF CELLULOSE ACETATE SOLUTIONS ON PURIFICATION OF THE FIBRE AND CONDITIONS OF ACETYLATION.- J. Sakurada and K. Hess. Berichte, 1931, 64B, 1174-83.

With increasing purification of the fibre before acetylation, the apparent viscosity of the cellulose acetate solutions diminishes together with the strongly marked anomaly with regard to the law of outflow. As with cellulose nitrate and ammonia copper cellulose solutions the viscosimetric properties appear to be the result of fibre purification and deorganization during which foreign matter with a great influence on the viscosity is removed, rather than of the existence of a large number of chemical individuals with different molecular weight. With increase in the concentration of H_2SO_4 the viscosity of the acetates diminishes greatly. Determination of the iodine numbers of the product indicates that the effect is due to the decomposing action of the acid on a substance accompanying cellulose in the fibres rather than to acetolytic degradation of the cellulose. The Röntgen diagrams of certain of the acetates resemble those of cellulose acetate I. They represent non-homogeneous materials. After hydrolysis the products show the superposition of the interferences of natural cellulose and hydrocellulose. (W) (Copied from Chem. Abs., 1932, 26, 1114.)

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CELLULOSE XLI. STANDINGER'S RELATIONSHIPS BETWEEN VISCOSITY AND MOLECULAR WEIGHT OF PREPARATIONS OF CELLULOSE.- K. Hess and I. Sakurada. Berichte, 1931, 64B, 1183-92.

The relationships proposed by Standinger are not independent. New measurements of viscosity of cellulose acetate solutions of varied origins failed to confirm Standinger's data. The propriety of applying Standinger's method of determination of the molecular weight of highly-polymerized substances to cellulose preparations is denied. The relationship between copper number and viscosity is similar to that between iodine number and viscosity. (W) (Copied from Chem. Abs., 1932, 26, 1114)

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CELLULOSE XLII. FORMATION FROM CELLULOSE FIBRES OF A CRYSTALLINE CARBOHYDRATE SOLUBLE IN WATER.- F. Kloges.
Berichte, 1931, 64B, 1193-1200.

Acetylation of cellulose, crystallization to remove glucose and cellobiose derivatives, and hydrolysis of residue with fermentation of carbohydrates soluble in water to remove dextrose, leaves an unfermentable residue of cellobiose and a mixture of carbohydrates crystallizable from methanol and H_2O. Fractional crystallization results in separation of products having iodine number 17-20, $[\alpha]_D$ + 12.5° to + 13.7°, and of iodine number 28-31, $[\alpha]_D$ + 18° to + 19°. The properties agree with those of cellohexose and cellotetrose. All the preparations give sharply defined Röntgen diagrams, agreeing with those of hydrocellulose. (W) (Copied from Chem. Abs., 1932, 26, 1114.)

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KERATIN MOLECULE: CONSTITUTUION OF THE.- J. B. Speakman and M. C.Hirst.
Nature, 1931, 128, P. 1073-4; cf. Chem. Abs., 25, 3366.

Wool fibre is built up of long-chain protein molecules lying parallel to each other and somewhat folded. Apparently the adjacent molecules are joined to each other by salt-forming unions between the free amino groups of the diamino acids and the free carboxyl groups of the dicarboxylic acids. In a solution with a pH outside the stability range, these unions are broken, permitting a permanent stretching of the fibre. (W) (Copied complete from Chem. Abs., 1932, 26, P. 1449.)

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CELLULOSE ACETATE RAYON: EFFECT OF HOT BATHS ON LUSTRE.- W. Stahl.
Seide, 1931, 36, 324-327, 358-363, 402,410, 439-443.
Dissertation, Dresden, 1931, P. 82.

Samples of cellulose acetate were treated with water, acids and alkalis at different temperatures and the changes in lustre observed. A decrease in lustre was first observed by treatment at temperatures of about 70° and the effect increased as the boiling point was approached. The change in lustre produced by treatment with alkalis at concentrations between N/10 and N/5 was very small, but with more dilute alkali a considerable decrease in lustre was observed. Hot water and dilute and concentrated acids also caused considerable loss of lustre. When the degree of saponification was determined by a colour reaction with potassium iodide and glycerin-sulphonic acid the products delustred by treatment with hot water, acids and very dilute alkalis showed no signs of saponification while those treated with N/10 sodium hydroxide were found to be partially saponified. It is therefore concluded that the loss of lustre produced by treatment of cellulose acetate rayon with hot liquids is not due to saponification. Microscopic studies reveal the presence of holes or bubbles in the delustred samples and tests with cellulose acetate rayon and films indicate that these are due to the development of gases or vapours in the swollen material. The influence of differences in the fine structure of cellulose acetate on the loss of lustre in hot baths is discussed and the effects of swelling agents and salts are described. Patent processes for the production of matt cellulose acetate rayon, methods for preventing the loss of lustre of cellulose acetate rayon by the use of lower temperatures, the addition of protective substances to the baths, or modifications in the composition and properties of the cellulose acetate and processes for restoring the lustre to matt cellulose acetate rayon are reviewed. (S) (Copied complete from J. T. I. abstract section, March, 1932.)

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PERIODIC FAULTY YARNS: EXAMINATION.- G. Krauter.
Leipzig. Monats. Text. Ind., 1931, 46, 377-378.

An account is given of the examination of periodic faults in yarns by winding the yarn in contacting turns on an iron rod inserted in twist tester. On winding off the yarn the number of turns from fault to fault can be read directly from the indicator, and the circumference of the rod being known, the distance between the faults can be determined. A rod of 8 mm. diameter is suitable for the purpose. If the fault is not shown up sufficiently by winding along, the rod may be examined in the half dark in coloured light, or, in some circumstances, under the ultra-violet lamp. Very often this succeeds if the rod is rotated and the fault can then be traced with a coloured pencil. With faults which are very difficult to see, stripping and re-dyeing with very sensitive dyes occasionally helps. (S) (Copied complete from J. T. I. abstract section, March, 1932.

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SWELLING III: THE ABSORPTION OF NEUTRAL SALTS BY COTTON.- A. Lotterwoser and Werner Hönsch.
Kolloid-Zeitschrift, 1931, 57, 206-21.

A purified cotton containing 7% H_2O and 0.30% ash, and having a copper number of 0.26 was used for the experiments. The velocity of absorption from aqueous solutions was studied up to 145 hours. Calcium chloride, potassium chloride, sodium chloride, and potassium thiocyanate showed maxima at 50, 50, 30, and 40 hours, respectively; littrium chloride solution showed a maximum Cl negative absorption at 30 hours. The isotherms (for 120 hours) reached a maximum which corresponded to 0.130 miles K Cl; 0.207 NaCl; 0.194 $CaCl_2$; and 0.433 KSCN per mol $C_6H_{10}O_5$. Swelling was measured by determination of hydrolysis number calculated from copper numbers. Determination of absorption by a sample treated with solutions of increasing and decreasing concentrations showed an irreversible absorption. (W) (Copied complete from Chem. Abs., 1932, 25, 5996.)

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WOOL MEASUREMENT TECHNIC.- R. H. Burns.
Record of Proceedings, Annual Meeting, American Society of Animal Production, January, 1930, Pp. 111-121.

This paper gives a short description of some of the methods which have been and are being used to measure the attributes of the wool fibre such as length, crimp, strength, elasticity, diameter or fineness, density or number of fibres per unit area on the skin, scales and lustre, and structure. The writer makes a plea for standardization of wool measurement methods, simplification of apparatus and coordination of problems and cooperation between wool research agencies. (B)

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MECHANISM OF ACTION OF CERTAIN DYEING ASSISTANTS ESPECIALLY OF WETTING AGENTS, IN THEIR USE IN DYEING AND PRINTING INDANTHRENE DYES.- W. Schramek and H.Velten.
Kolloid Beihefte, 1931, 34, P. 80-114.

The action of the dyeing assistants, Dekal, Nekal A, Nekal Bx dry, Nekal AEM, Prastabitol V, Patentappretur81 lW, Intrasol, and of glue was investigated. The efficacy of these assistants in protecting indanthrene sols from pptn. by electrolytes is in the series Dekal> glue>textile oil>Nekals. Prevention of coagulation of dyestuff particles on their entering the capillary interstices of fibres in cloth is in the following order: Textile oil $\geq$ glue> Nekals >Dekal. The action of glue is due to the high viscosity of its solutions. In using glue as a protective colloid, the use of a bivalent electrolyte reverses the charge of the negatively charged indanthrene sols; Nekal AEM acts like glue.(W) (Copied from Chem. Abs., 1932, 26, 1126.)

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MICROANALYSIS OF FIBRES.- Edward R. Schwarz.
Textile World, May 7, 1932, P. 25-27.

The last installment of the final article on textile microscopy covering fibre structure, grading of fibres, defects in fibres, the effects of moisture and heat, uses of polarised light, etc. (S)

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MORPHOLOGY OF CELLULOSE FIBRES.- Bruno Rabinowitsch.
Kolloid-z., 1931, 57, 203-6.

Trinitroramie and tripalmityl ramie fibres in swollen and unswollen state were observed with the Peterfi Manipulator. The fibres may be dyed and observed in polarized light to emphasize details. Photomicrographs are reproduced. (W) (Copied from Chem. Abs., 1932, 26, 1116.)

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STAPLE LENGTH OF FOREIGN COTTONS CONSUMED IN UNITED STATES.- Peter M. Strang.
Textile World, April 16, 1932, P. 44.

An editorial comment on a brief article covering Egyptian, Peruvian, Indian, and Chinese cotton notes that there must be something to be desired in 1 1/8" American cotton or there would not be so much foreign cotton used. It is also remarked that cottons above 1 3/8" staple are practically all foreign. (S)

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DETERMINING FORMS OF TENDERING IN COTTON YARNS.- H. Ellis.
Textile Recorder, 1932, No. 586, P. 29-30.

A treatment is described for cotton fibres prior to microscopic examination to determine the cause of injury. Photomicrographs show the characteristic appearance of fibres damaged mechanically and by heat. (W) (Copied from Chem. Abs., 1932, 26, 1448)

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NOTES ON THE DEVELOPMENT OF A CLASSIFICATION OF RAW SILK BASED ON THE MECHANICAL TEST.- W. F. Edwards.
Am. Silk & Rayon Jnl., June, 1932, P. 57-63.

Part V of a series of six parts concerned in this instance with a study of size deviation on the same samples used for the seriplane tests discussed in Part II. A large amount of tabulated data is included with the article. (S)

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PRESENT STATUS OF RAW SILK CLASSIFICATION.- D. E. Douty.
Am. Silk & Rayon Jnl., June, 1932, P. 47-50.

A continuation of the discussion of the progress reports of the raw silk classification committee. Considerable detail is given regarding comparison of the American and Japanese classifications. (S)

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RAW SILK FIBRES.- W. Wagner.
Seide, 1931, 36, 364-6.

A discussion of natural silk fibres with relation to the natural gumming and chemical or mechanical degumming processes, and effect of removing gum on the physical properties of the fibre. (W) (Copied complete from Chem. Abs., 1932, 26, 1447)

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SOME CHEMICAL ASPECTS OF SILK WEIGHTING.- A. A. Cook.
Am. Silk & Rayon Jnl., June, 1932, P. 45-46.

Continuation of an article from the May issue is concerned with external factors, chlorides, wear and tear, and other miscellaneous effects including the protection of weighted silk. (S)

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CHEMISTRY OF THE VEGETABLE TEXTILE FIBRES. III. RECOGNITION AND DIFFERENTIATION OF THE PRINCIPAL VEGETABLE TEXTILE FIBRES.- A. J. Sauri.
Quim. Ind., 1931, 8, 94, 281-5; cf. Chem. Abs., 26, 310.

Detailed directions are given for using Vetillard's method of identifying cotton, linen, New Zealand flax, hemp, ramie, jute and nettle when present as the natural fibre, as thread or in fabric. Supplementary and confirmatory chemical tests are described. Photomicrographs show cross-sectional shapes of the fibres, and the appearance of the fibres after treatment with Vetillard's reagent. (W) (Copied complete from Chem. Abs., 1932, 26, 1447.)

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CELLULOSE: DEGRADATION IN RAYON MANUFACTURE.
Silk Journal, 1931, No. 90, P. 45; No. 91, Pp. 37-38.

The degradation of cellulose in the manufacture of rayon is discussed and results obtained by various investigators in studying the degradation occurring in the ageing of alkali-cellulose are quoted. (S) (Copied complete from J. T. I. abstract section, March, 1932)

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STRAINED VISCOSE THREADS: DETECTION OF:- J.M. Preston.
Rayon Record, 1930, 4, 1053.

Hall's test for stretched viscose threads (Chem. Abs., 24, 5504) is also applicable to nitro-cellulose silk, but not to cuprammonium silk. Conclusion: The test depends on the greater accessibility of the reducing groups present as produced by stretching. (W) (Copied complete from Chem. Abs., 1932, 26,1437)

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RAYON YARN: TESTING.
Proc. Amer. Soc. Testing Materials, 1931, 31, Pt. 1, 974-981.

Tentative specifications are proposed for methods of identifying rayon and determining denier, twist and breaking load. (S) (Copied complete from J. T. I. abstract section, March, 1932.)

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RAW COTTON OF DIFFERENT ORIGINS AND QUALITY AND ITS BEHAVIOR DURING NITRATION.- O. Ansel and S. S. Wong.
Lingnan Sci. Jnl., 1929, 8, 587-92.

Nitration of various cottons gave different yields of nitrocellulose depending upon the cotton used. The data show that it is more economical to use the cheaper grades of cotton for the preparation of nitrocellulose. (W) (Copied from Chem. Abs., 1932, 26, 1436.)

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PSYCHO-TECHNICAL DETERMINATION OF THE ECONOMICAL OPTIMUM IN THE ILLUMINATION OF TEXTILES MILLS.- N. Goldstern and F. Putnoky. A. A. Wohlauer, translator.
J. Franklin Inst., 212: 613-32, Nov., 1931.

Factors such as amount and distribution of inten sity have been correlated wit h working speed for conditions existing in the textile industry in Germany. (S) (Copied complete from Eastman Kodak Bulletin, Feb., 1932.)

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FUR DYES: THEIR OXIDATION AND IDENTIFICATION ON THE FIBRE.- R. B. Foster and C. Soyka.
J. Soc. Dyers and Colourists, April, 1931, P. 99-109.

A comprehensive analytical scheme is given for the identification of fur dyes and the amino bases used in fur dyeing. (S) (Copied complete from Eastman Kodak Bulletin, Feb., 1932)

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1931 DEVELOPMENTS IN INDUSTRIAL PROCESS INSTRUMENTS.- M. F. Behar.
Instruments, Jan., 1932, P. 6-10.

A review of progress covering the important features in this field. (S)

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METHYLENE ETHERS OF CARBOHYDRATES. I. CELLULOSE METHYLENE ETHER.- F. C. Wood.
J. Soc. Chem. Ind., 1931, 50, 411-8T.

A complete review of the literature on the condensation of cellulose and formaldehyde, and details of author's repetition of Eschalier's original expts. (Fr. pat. 374,724 of 1906). A new definite cellulose monomethylene ether $C_6H_7O_2(OH)$ (O_2CH_2) was obtained and its properties studied. Its isolation opens the possibility of investigating the reactions of the third OH group in cellulose. (W) (Copied from Chem. Abs., 1932, 26, 1254.)

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THE DELUSTERING OF ACETATE SILK.- W. Weltzien and A. Brunner.
Seide, 1931, 36, 399-401.

A discussion of theories, and experiments showing that delustering is not dependent on presence of air, and can take place at low temperatures in presence of swelling agents. A type of delustering due to surface emulsification is described. (W) (Copied from Chem. Abs., 1932, 26, 1448)

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EPIPHOT.- Clay-Adams Co.
Instruments, Jan., 1932, P. 24.

A brief description of a compact instrument for direct observation or photography at low magnifications for surfaces of fabrics, yarns, and so forth. Special illumination is provided and is wholly self contained. (S)

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KNIFE-EDGE BEARINGS.- Kalman J. DeJuhasz.
Instruments, Feb., 1932, P. 37-39.

A brief article of interest to any one concerned with the design of instruments as well as with their use. The article covers physical properties, materials of construction, and the methods of dyeing and manufacture. A series of excellent illustrations indicate points of construction. (S)

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YARN DIAMETER AND FABRIC CONSTRUCTION.- T. Woodhouse, F.T.I., and A.Brand,A.T.I.
Textile World, May 28, 1932, Pp. 52-55.

Supplementary to previous articles by the same authors in Textile World on cloth structure, and deals briefly with calculations regarding the relative diameters of yarns and their application to the setting of fabrics. (C)

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EFFECTIVENESS OF SILICON IN WEIGHTING AND BLEACHING.- Benjamin Levitt.
Silk, May 15, 1932, Pp. 30, 57-8.
Am. Dye. Rptr., June 6, 1932, Pp. 359-60, 377.

Briefly describes various compounds of silicon and their use in industry, with particular reference to the use and effect of the silicates of soda in textile processing. (C)

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THE MANUFACTURE AND CONSTITUTION OF THE NEW WETTING OUT AND EMULSIFYING AGENTS.- Chas. E. Mullin and Ross M. Stribling.
Textile Colorist, May, 1932, Pp. 331-34.

The second of a series of articles reprinted from the June, October and November, 1929 issues of Textile Colorist, this being from the October issue and reviewing American, British and French patents covering the products and their manufacture. The patents covering their uses are reviewed in the November, 1929, issue that is yet to be reprinted. (C)

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FIBRE DAMAGE BY EXPOSURE TO LIGHT.- A. Landolt.
Mell. Textilber., 1931, 11, 937-40.

Among the known accelerating factors in the damage of textiles by light are: (1) Presence of certain vat dyes having catalytic action; (2) Availability of oxygen from air or otherwise; (3) Alkalinity; (4) Moisture; (5) Light of short wave length. The importance of alkalinity is discussed. (W) (Copied from Chem. Abs., 1932, 26, 1447)

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DYES DERIVED FROM ACENAPHTHENEQUINONE AND ISATIN: QUINOXALINOACENAPHTHAZINES AND QUINOXALINOINDAZINES.- P. Chandra Dutta and Satish Chandra De.
Berichte, 1931, 64B, 2602-4.

The following new dyes were prepared:

Quinoxalinoacenaphthazine;	dyes wool	yellow;
5-nitro derivative,	" "	brownish yellow
5,6 dinitro derivative,	" "	" "
Quinoxalinoindazine;	" "	reddish brown
5-bromine derivative,	" "	brown
5, 7-dibromo derivative,	" "	"
5-bromo-7-nitro derivative,	" "	chocolate brown
5-chloro-derivative,	" "	brown
5-nitro derivative,	" "	scarlet

(W) (Copied from Chem. Abs., 1932, 26, 989)

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DYES DERIVED FROM PYRAZINE-2, 3-DICARBOXYLIC ACID.- S. D. De and P. C. Dutta.
Berichte, 1931, 64B, 2606-9.

New phthalein dyes have been prepared by condensing pyrazine-o-dicarboxylic acid with various organic hydroxyl compounds and amines. Resorcinol pyrazine-dicarboxylein; orcinol compound, phloroglucinol, m-Aminophenol, m-Dimethyl-aminophenol, m-Diethylaminophenol, m-Phenylenediamine and Tetrabromoresorcinol compounds are described. (W) (Copied from Chem. Abs., 1932, 26, 1287.)

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THE RIPENING OF VISCOSE.- T. Vitale.
Giorn. Chim. Ind. Applicata, 1931, 13, 476-9.

The mechanism of the ripening of viscose has been studied. The reaction is: n $C_6H_8O_3(ONa)OCS_2Na \rightarrow (n-1)C_6H_8O_3(ONa)OCS_2Na + C_6H_8O_3(OH)_2 + 2\ NaOH + CS_2$. A vacuum increases the rate of ripening by removing the reaction product CS_2, while addition of CS_2 retards the action. The above reactions make it possible to regulate the velocity of ripening of viscose. (W) (Copied from Chem. Abs., 1932, 26, 1437)

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RESEARCH--AND RHETORIC.
Am. W & C Rptr., June 2, 1932, Pp. 1, 37-9.

Apparently designed as a critical analysis of an abstract of the address of Maurice Holland before the U. S. Institute for Textile Research, May 4, 1932, and to prove that "practical manufacturers in textile work have built up a series of processes, equipment and methods--an industry which scientists and technicians may criticize but cannot greatly improve."

Mr. Holland stated that "the essential manufacturing processes have not been changed in 100 years," and no attempt is made to controvert the statement, but he is incorrectly quoted as having claimed that "the textile industry is 100 years behind the times" and the article effectually disposes of this "straw man". The apparent effort of the article to prove that the industry owes its development wholly to practical or empirical methods is weakened by classifying fast dyes and rayon among such achievements, and it might have included many other fruits of fundamental research that have played an important part in the development of the textile industry. (C)

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A SCIENCE AUDIT OF THE TEXTILE INDUSTRY.- Maurice Holland.
Am. Dye. Rptr., June 6, 1932, Pp. 375-77.

Abstract of address before U. S. Institute for Textile Research, May 4, 1932. Expresses the opinion that Germany and Great Britain are far ahead of this country in fundamental textile research;that the textile industry in America "is a 1932 model car running around on a gay '90 chassis." An inevitable development of banking will be a demand for a science audit of industry, covering such factors as the technical state of the art in this and foreign countries, of plant processes and product, of research facilities and the attitude of the management toward research. (C)

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ELECTROPHORESIS AND pH: WHAT THEY MEAN TO THE MILL MAN.- W. D. Appel.
Am. Silk and Rayon Jnl., June, 1932, P. 36-7.
Am. W & C Rptr., May 19, 1932, P. 11.

Abstract of a paper presented at a meeting of U. S. Institute for Textile Research in New York City,May 4, 1932. (S) (Published complete in this issue of T. R. I. Bulletin)

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BOOK REVIEWS

THE COMMERCIAL PROBLEMS OF THE WOOLEN AND WORSTED INDUSTRIES.- Paul T.Cherington.
The Textile Foundation, Inc., Commerce Bldg., Washington, D.C., Pp. 242, $2.50.

The report of the first of a series of studies of the commercial problems of the major textile industries, authorized and financed by The Textile Foundation, Inc. It presents a cross-section picture of current, or very recent, conditions in the woolen and worsted industries; is devoted mainly to a discussion of desirable policies and to the suggestion of a program fitted to them. The program of betterment that is believed to emerge from the consideration in this report may be abstracted as follows: The complete coverage of factual statistics of production and distribution; their adequate interpretation by existing or other institutions properly equipped for such work, and the development of a keener statistical sense by mills and selling houses; inter-association cooperation by manufacturers' and distributors' organizations on problems of mutual interest; the formation of specialized economic councils by such associations for the planning of methods to improve underlying conditions, these councils to have advisory members representative of law and the public who would reflect the social point of view; encouragement and perfection of existing bureaus and services designed to aid in the solution of style problems; cooperation with U. S. Institute for Textile Research as a means for accomplishing proposed economic objectives and for furthering technical research. (C)

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THE WORSTED YARN INDUSTRY IN 1931.
Industrial Research Department, Wharton School of Finance and Commerce, University of Pennsylvania. Wool Release No. 7, May 12, 1932, Pp. 15.

A report on the 1931 worsted yarn production survey conducted by this department, analyzing annual changes in production by counts, markets, mill types, and states, 1929-31. (C)

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